

FREYDLIN, L. N.

5

✓ The activity of a skeletal iron catalyst in hydrogenation reactions. L. Kh. Freydlin, K. G. Rudneva, and A. M. Sultanov. *Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.* 1954, 435-8 (Engl. translation).—See C.A. 49, 14043c. H. L. H.

USSR

12

10/11

FREYDLIN, L. Kh.

USSR/ Chemistry Chemical analysis

Card : 1/1

Authors : Freydlin, L. Kh., and Rudneva, K. G.

Title : ~~Chemical method of investigating the metal-hydrogen nature of a skeleton nickel catalyst.~~
Chemical method of investigating the metal-hydrogen nature of a skeleton nickel catalyst.

Periodical : Izv. AN SSSR, Otd. Khim. Nauk, 3., 491 - 496, May - June 1954

Abstract : A chemical method for the dehydrogenation of a skeleton nickel catalyst, which serves simultaneously as a means of determining the amount of chemically active H contained in the metal, is described. The presence of a bond between the activity of the catalyst and the H contained in it can be established by this new method. The effect of the catalyst volume on the rate of reaction was also investigated and the results are given in graphs. Eight references: 5 USSR, 1 English, 1 German and 1 French. Graphs.

Institution : Acad. of Sc. USSR, The N. D. Zelinskiy Institute of Organ. Chemistry

Submitted : April 29, 1953

1. FREYDLIN, L. Kh.

USSR/Chemistry Catalysts

Card : 1/1

Authors : Freydlin, L. Kh., Radneva, K. G., and Sultanov, A. S.

Title : Investigation of the activity of a skeleton iron catalyst in hydrogenation reactions

Periodical : Izv. AN SSSR, Otd. Khim. Nauk. 3, 511 - 516, May - June 1954

Abstract : The activity of a skeleton iron catalyst, in hydrogenation reaction, was investigated. Considerable activity of this catalyst was established during hydrogenation reactions at 20° and normal pressure. Information is given on the activity of the iron catalyst during the hydrogenation of an ethylene bond as compared with the activity of a skeleton nickel catalyst. The rates of hydrogenation of compounds containing a ternary bond and compounds containing the ethylene bond, are discussed. Five references: 2 USSR, 1 German, 2 English. Table, graphs.

Institution : Acad. of Sc. USSR, The N. D. Zelinskiy Institute of Org. Chemistry

Submitted : April 29, 1953

FREYDLIN, L. Kh.

USSR/Chemistry - Catalysts

Card 1/2 Pub. 40 - 19/27

Authors : Freydlin, L. Kh., and Rudneva, K. G.

Title : Reaction of skeletal nickel components with mineral oxidizers

Periodical : Izv. AN SSSR. Otd. khim. nauk 6, 1082-1088, Nov-Dec 1954

Abstract : An investigation was conducted to determine the selectivity of the reaction between skeletal catalyst components - nickel and hydrogen - and mineral oxidizing agents at room temperature. Simultaneous participation in the reaction process of both catalyst components was observed when the catalyst was treated with potassium permanganate.

Institution : Acad. of Sc., USSR, The N. D. Zelinskiy Institute of Organ. Chemistry

Submitted : January 22, 1954

Periodical : Izv. AN SSSR. Old. khim. nauk 6, 1082-1083, Nov-Dec 1954

Card 2/2 Pub. 40 - 19/27

Abstract : During reaction with sodium iodate the oxidizer was seen to react first with the sorption hydrogen and then with the metal. The rate of reaction of the skeletal Ni with oxygen was found to be much lower than with benzoquinone and sodium iodate. About $2/3$ of the oxygen reacts with the hydrogen and $1/3$ with the Ni. Six references: 3 USSR, 2 French and 1 English (1933-1951). Tables; graphs.

FREYDLIN, L. Kh.

Subject : USSR/Chemistry AID P - 1113
Card 1/1 Pub. 119 - 3/7
Author : Freydlin, L. Kh. (Moscow)
Title : Catalysis of vapor-phase hydrolysis of aromatic halides
by silica gel and copper
Periodical : Usp. khim., 23, no. 5, 581-604, 1954
Abstract : Factors influencing vapor-phase hydrolysis are discussed,
such as the specific surface and porosity of silica gel,
temperature of the reaction, water - halide ratio, de-
activating effect of added minerals, and the effect of
copper. Five diagrams, 4 tables, 66 references (42
Russian: 1926-1953).
Institution : None
Submitted : No date

FREYDLIN, L. Kh.

USSR

Alkylation of butane by propylene in the presence of aluminum oxide. L. Kh. Freydlin, A. A. Balamina, and N. M. Nakhova (N. D. Zelinski Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). Dokl. Akad. Nauk SSSR, 90, 1111-1113 (1954). All. Chem. Abstr., 49, 1111 (1954).
Al₂O₃ was studied in a flow-type apparatus and a catalyst is supplied. Reaction runs at 420°C. and 10-15 atm. pressure gave fractions corresponding to the C₄ and C₅ hydrocarbons. Most of the propylene reacted below 175° the main fractions being C₄ and C₅ and C₆ and C₇. At 400° the latter fraction is C₆ and C₇ of a heptane fraction. At 500° the C₆ and C₇ fraction is to 28-30%. The level of the pressure and temperature to alter the reaction course. The C₄ and C₅ fraction rise with increase of space velocity and 2.6 to 4.0 tenths of a unit of C₄H₈ does not affect the level of reaction, although it does raise somewhat the yield of the C₆ and C₇ fraction and lowers the yield of high boiling fractions. The heptane fraction is mainly C₆ and C₇ and C₈ and C₉ and C₁₀ by Raman spectrum. N. M. Nakhova.

✓ The metal-hydrogen character of catalysts of low-temperature hydrogenation by the chemical method. L. Kh. Ibratulin and E. G. Rudneva (N. D. Zelinski Inst. Org. Chem. Acad. Sci. U.S.S.R., Moscow). *Kataliticheskie i hidrogenirovannye sredy*. Akad. Nauk Kazakh. S.S.R., *Trudy Akad. Nauk* 1955, 38-49.—F and R. bring out the similarity of results obtained in the study of metal-H active surface either by chem. methods or by potentiometry. Low-temp. catalysts of Ni and Fe, prepd. by various methods, were found as to activity in various hydrogenations. The Ni catalysts prepd. by displacement from aq. soln. with Zn or by decompn. of double Ni-Mg salt of HCO_2H in H retain much H. They are inactive if this H₂ is removed; thus the metal-H type of active surface in these catalysts is shown. The probable modes of formation of such active surfaces are discussed theoretically.

G. M. Kosolapoff

FREYDLIN, L.Kh.

Chemical investigation of the relation of catalyst activity in low-temperature hydrogenation and the presence of hydrogen on the catalyst. L. Kh. Freydlin and K. G. Rudnev. *Vopr. Khim. Kinetiki, Kataliza i Reaktivnosti*, Akad. Nauk S.S.S.R. 1955, 557-59. — The Fe skeletal catalysts, was tested by treating them in an atm. of N_2 with substances capable of being hydrogenated. One such substance, benzoquinone in a soln. of freshly distd. dioxane, was found to remove all the H from the catalyst surface, with a complete deactivation of the catalyst. Michler's ketone, vinyl phenyl ether, and anthraquinone removed less H from the surface, did not deactivate the catalyst, and addnl. H could be removed from the surface with benzoquinone. The H is thus seen to exist in two forms on the catalyst surface, as a surface-adsorbed layer and as structurally adsorbed H. The skeletal Ni catalyst was prepd. in a variety of ways; the Fe catalyst by leaching the Al from a Fe-Al alloy with NaOH soln. The deactivated catalyst can be reactivated, e.g. Ni catalyst by heating for 2 hrs. at 300° in a stream of H_2 . The Ni catalyst obtained by leaching Al from a Ni-Al alloy had a low-temp. hydrogenation activity similar to Pt and Pd. This high activity could not be attributed to the form of the crystal lattice, the presence of impurities, the particle size or their specific surface, since none of these properties was changed by the chem. dehydrogenation process, and is attributed by the author to a hydriding of the surface. In a low-temp. catalyst prepd. in a variety of ways, the active surface is believed to form in 2 stages: (1) the production of a metal surface. (2) its interaction with H.

W. M. Sternberg

"APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3

SECRET - KH

1. TACTICAL BUSINESS & COMMUNICATIONS
2. 10/1/77

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3"

FREYDLIN, L.Kh.; RUDNEVA, K.G.

Interaction of the components of Raney nickel with mineral oxidizers. Izv.AN SSSR. Otd.khim.nauk no.6:1082-1088 N-D '55. (MIRA 8:5)

1. Institut organicheskoy khimii im. N.D.Zelinskogo Akademii nauk SSSR.

(Catalysts, Nickel)

FREYDLIN, L. KH.

USSR/ Chemistry - Catalysts

Card 1/2 Pub. 22 - 23/52

Authors : Freydlin, L. Kh.; Tulupova, E. D.; Borunova, N. V.; Minachev, Kh. M.;
and Shuykin, N. E. Memb. Corresp. of Acad. of Sc. USSR

Title : Selective increase of Ni-Al₂O₃ catalyst stability by compressing

Periodical : Dok. AN SSSR, 100/2, 283-286, Jan 11, 1955

Abstract : Investigation was conducted to determine the effect of two different organic substances on the stability of $\text{Ni-Al}_2\text{O}_3$ catalysts prior and after compressing the catalyst. The relative stability of the compressed and uncompressed catalysts was established by the change in their activity during dehydrogenation reactions of cyclohexane and narrow Maykop gasoline fractions.

Institution : Acad. of Sc. USSR, The N. D. Zelinskiy Institute of Organic Chemistry

Submitted : July 13, 1954

Periodical : Dok. AN SSSR, 100/2, 283-286, Jan 11, 1955

Card 2/2 Pub. 22 - 23/52

Abstract : It was found that compressing will increase the stability of an Ni-Al₂O₃ catalyst during the dehydrogenation of hydro-aromatic hydrocarbons in the presence of a poison-five-membered cyclene. In the case of poisoning with thiophene, which occurs according to a different mechanism, compressing shows no effect on the catalyst stability. Six USSR references (1926-1953). Graphs.

FREYDLIN, L. KH.

USSR/ Chemistry - Hydrogenation catalysts

Card 1/1 Pub. 22 - 30/60

Authors : Freydlin, L. Kh., and Rudneva, K. G.

Title : ~~Extrusion of Ni catalyst~~
About a Ni low-temperature hydrogenation catalyst prepared by the extrusion method

Periodical : Dok. AN SSSR 100/4, 723-726, Feb 1, 1955

Abstract : The possibility of preparing catalytically active Ni by extrusion from the aqueous solutions of its salts was investigated and the nature of its activity is described. It was found that the treatment of the Ni with hydrogen at an increased temperature is of extreme importance for the activity of the Ni. It was also established that the Ni catalyst, which is considered highly active in hydrogenation reactions occurring at room temperatures, can be easily prepared by extrusion from ordinary accessible reagents. A reduction in extrusion temperature from 60° to room temperature leads to a certain reduction in the activity of the catalyst. Six references: 4 USSR, 1 Swiss and 1 Japanese/USA (1921-1954). Graphs.

Institution : Academy of Sciences, USSR, The N. D. Zelinskiy Institute of Organic Chemistry

Presented by : Academician A. A. Balandin, July 24, 1954

"APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3"

FREYDLIN, L.Kh; BALANDIN, A.A., akademik; NAZAROVA, N.M.; YEGOROV, Yu.P.

Alkylation of propane and Δ -pentane with propylene at high temperatures, under high pressures, and in presence of aluminum oxide. Dokl. AN SSSR 105 no.6:1270-1273 D '55. (MLRA 9:4)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo Akademii nauk SSSR.
(Alkylation) (Hydrocarbons)

"APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3

APPROVED FOR RELEASE: 06/13/2000

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It has been established that nickel and aluminum oxides
strongly recrystallize under water vapor pressure in a
vacuum. The experiments treated nickel oxides on a carrier
material, which was heated in water vapor pressure.

USSR/Kinetics - Combustion. Explosions. Topochemistry. Catalysis. B-9

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18626

Author : I.Ye. Neymark, L.Kh. Freydlkh, A.I. Rastrenenko, N.V. Borunova.

Inst : Academy of Sciences of USSR.

Title : Change in Macrostructure and Catalytic Activity of Aluminum Oxide under Influence of Treatment with Steam and at Compression.

Orig Pub : Izv. AN SSSR, Otd. khim. n., 1956, No 7, 784-789.

Abstract : The following three samples of Al_2O_3 -catalysts were studied: fresh Al_2O_3 (I), I treated 5 hours with steam at 350° and 100 atm. (II), II compressed with 20,000 atm. (III). As compared with I, a decrease of the specific surface S from 355 to 125 sq.m/g, an increase of the prevailing pore radius r from 30 to 90 A, and a decrease of the catalytic activity in dehydration reactions of formic acid and C_2H_5OH was detected in the sample II. The

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Referat Zhur - Khimiya, No 6, 1957, 18626

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3

The dissociation depth of C_2H_5OH at 400° in case of I, while in case of II this reaction did not take place even at 400 to 425° . In case of III, S = 280 sq.m/g, r was about 10 A; the apparent density was about 2.5 times greater than that of II; the volume of transition pores was about 5 times less. The specific catalytic activities of I and III in the dehydration reaction of $HCOOH$ at low temperatures differ insignificantly; at high temperatures, the catalytic activity of III drops considerably, which, in the authors' opinion, is explained by the diffusion slowing down in consequence of insufficient transition pores. The authors assume that treatment with steam can serve as a method of controlling the porosity character of oxide catalysts.

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FREYDLIN L. Kh.

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The change in the macrostructure and in the catalytic activity of aluminum oxide on treatment with water vapor and on being compressed.

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APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3"

USSR/Kinetica - Combustion. Explosions. Topochemistry. Catalysis. B-9

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18625

Author : L.Kh. Freydlin, A.A. Balandin, N.V. Borunova, A.Ye. Agromov.

Inst : Academy of Sciences of USSR.

Title : Mechanism of Deactivation of Nickel Catalysts by Steam Under Pressure.

Orig Pub : Izv. AN SSSR, Otd. khim. n., 1956, No 8, 913-922

Abstract : Unreduced catalysts of the composition 35% of NiO and 65% of Al_2O_3 , as well as Ni-catalysts prepared from them after reduction were treated at 350° with amixture of H_2 (700 atm) and steam (100 atm) 5 hours in a special high pressure reactor. It was found that their activity in the reaction $C_6H_6 + 3H_2$ and in the reverse reaction decreased strongly after the treatment, especially if the samples had been treated thus before the reduction. In this case, the magnitude of the specific surface of

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USSR/Kinetica - Combustion. Explosions. Topochemistry. Catalysis. B-9

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18625

samples decreases (from 170 and 80 to 10 and 30 sq.m/g respectively), which the authors explain by recrystallization of nickel lower oxide, as well as of the carrier. The authors think that the bibliographically recorded deactivation of reduced Ni-catalysts (and, as it seems, also of Fe-catalysts) by steam during the process of work is explained by the appearance of a surface film or a phase of NiO, which recrystallizes rapidly and the reduction process of which is hampered and results in the formation of little dispersed Ni.

Card 2/2

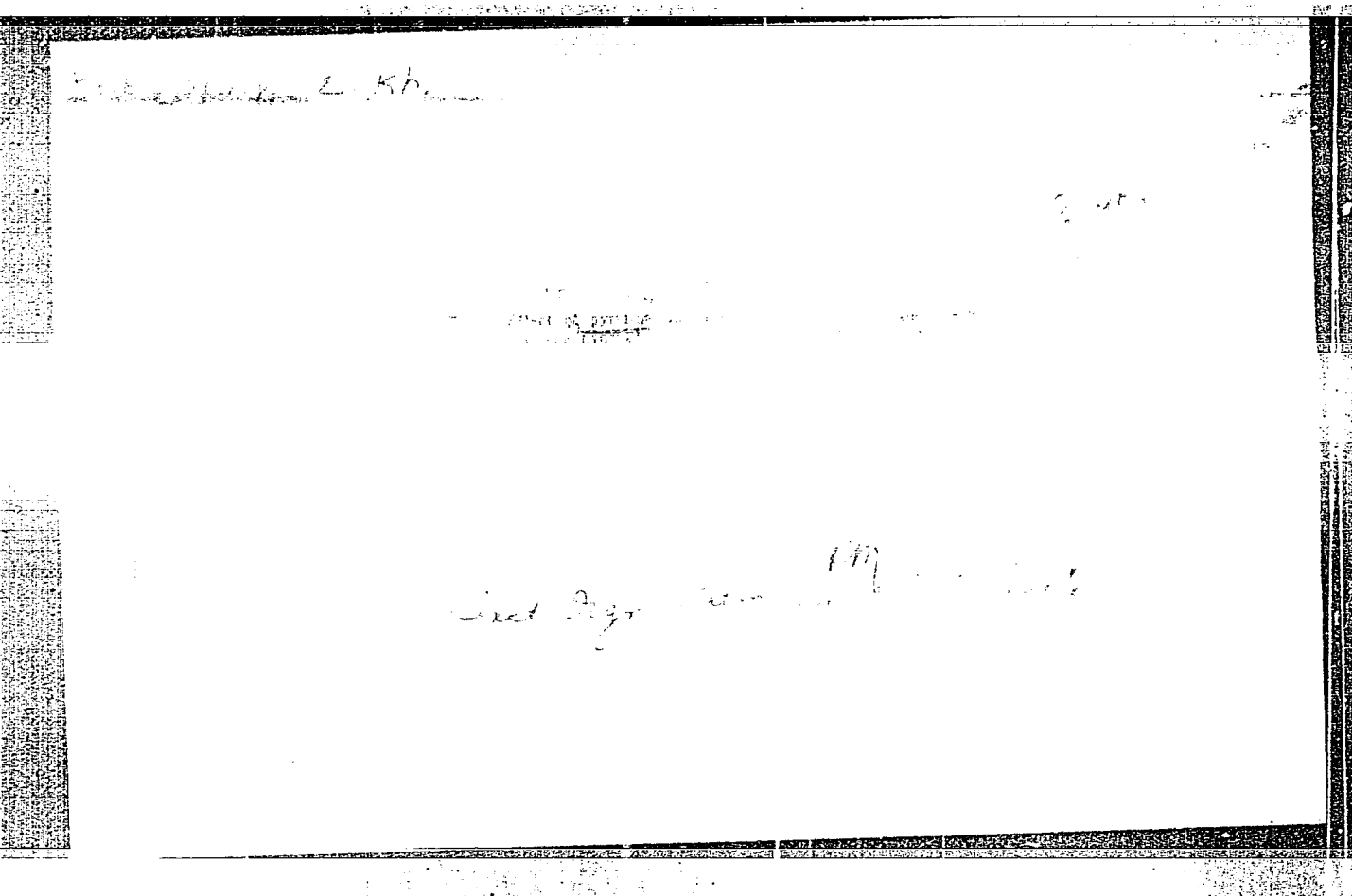
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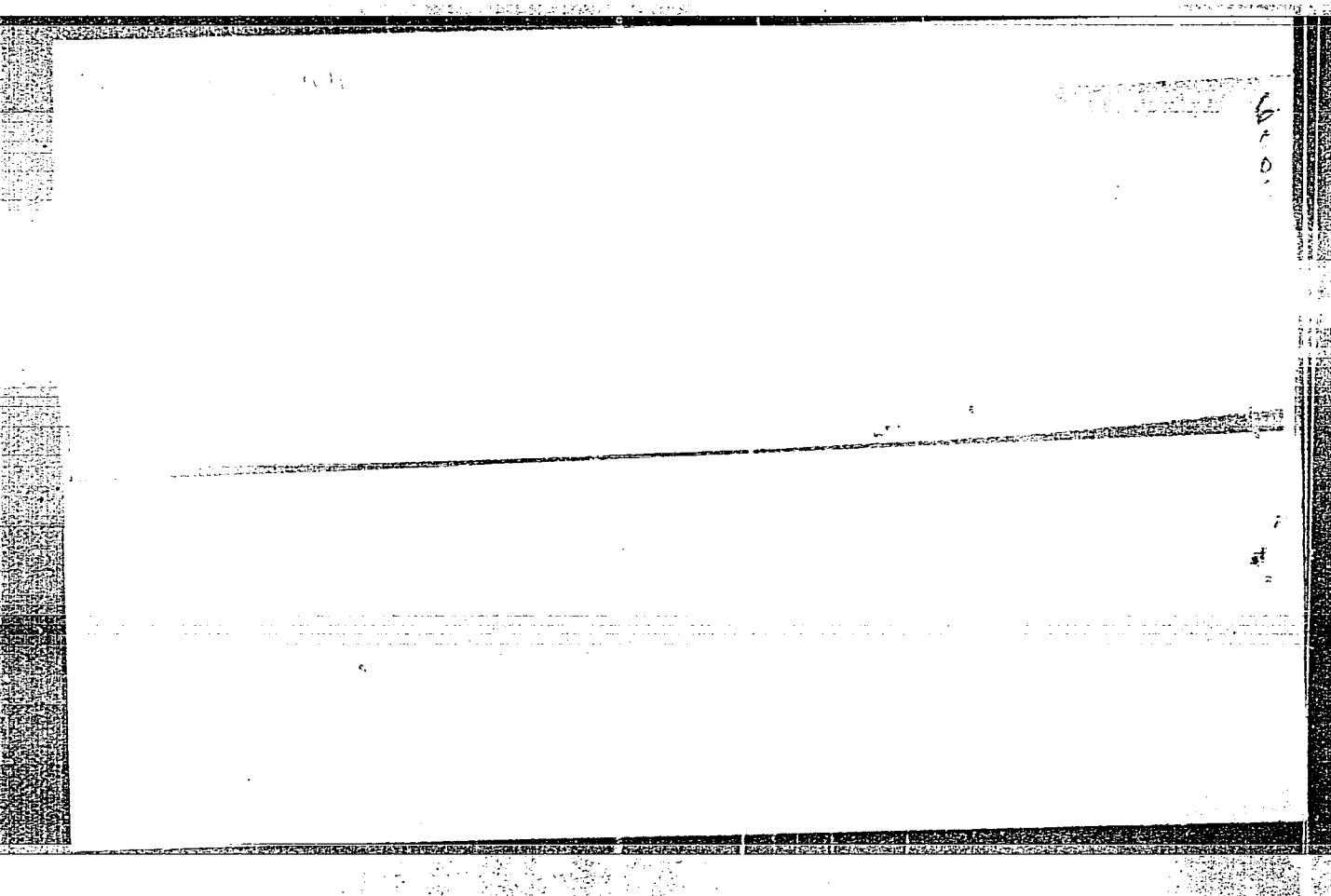
FREYDLIN, Lkh

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Densifying Mechanism
Nickel Catalyst

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FREDDY, L.K.

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3"

1. Properties of a nickel catalyst prepared by the decomposition
of the double nickel sulfide. (continued)

1.1. Yield

1.2. Purity

1.3. Activity

1.4. Stability

1.5. Effect of temperature on activity

1.6. Effect of pressure

SULTANOV, A.S.; FEDOROV, M.F.; FREYDLIN, L.Kh.

Reduction of acetaldehyde, acetone, and cyclohexanone on zinc-copper catalysts. Izv. AN Uz. SSR. Ser. khim. nauk no.4:91-94 '57.
(MIRA 11:9)

(Reduction (Chemical)) (Aldehydes) (Ketones)

FREYDLIN, L.KH.

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topo-chemistry, Catalysis.

B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7258.

Author : A.A. Balandin, L. Kh. Freydlin, N.V. Nikiforova,
Inst : Academy of Sciences of USSR. *Instit. Organic Chem. N.D. Zelinskiy*
Title : Kinetics of Catalytic Reduction of Organic Peroxides and Hydroperoxides. Report 1. Hydrogenation of Isopropylbenzene Hydroperoxide, Ethylphenylisopropyl Peroxide and Tetralin Hydroperoxide.

Orig Pub: Izv. AN SSSR. Otd. khim. n., 1957, No 4, 443-450.

Abstract: The hydrogenation kinetics of isopropylbenzene hydroperoxide (I), ethylphenylisopropyl peroxide (II), tetralin hydroperoxide (III) and ditertiarybutyl peroxide dissolved in CH_3OH , $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_6\text{H}_{13}\text{OH}$, C_6H_{12} , C_6H_6 or decalin was studied. The reactions were carried out in glass vessels under $p = 1$ atm and at 5 to 50° on Raney's catalyst and palladium black. The zero order is observed nearly

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APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413630001-3"

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topo-chemistry, Catalysis.

B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7258.

in all the cases. the reaction products are corresponding alcohols, the apparent activation energies for the hydrogenation of I and II in CH_3OH solutions on Ni are 5.0 and 5.4 kcal per mole correspondingly. The nature and structure of substitutes, as well as the solvent character influence the reaction rate: the reaction rate in $\text{C}_2\text{H}_5\text{OH}$ is 8 to 12 times greater than in other solvents. Slowing down by reaction products was noted at the hydrogenation of I. The authors point out that the obtained results agree with the computations carried out based on the multiplet theory.

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FREYDLIN, L. K.

Reaction of hydrolytic cleavage of 1-cyclohexyl-2-
cyclohexanone to cyclohexanone.

J. Z. Shul' (U. S. S. R.) and G. A. Zakharenko (U. S. S. R.)

The reaction of hydrolytic cleavage of 1-cyclohexyl-2-cyclohexanone with water was studied. The reaction conditions were varied. The results of the study are presented.

1/1

FREYDLIN, L. Kh.

Hydrogenation of cyclopentadiene in binary mixtures with unsaturated hydrocarbons on palladium and platinum black. L. Kh. Freydlin and B. D. Polkovnikov. *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1957, 641-5. Cyclopentadiene (I) mixed with the following unsatd. hydrocarbons in a 1:3 molar ratio was hydrogenated: cyclohexene (II), toluene (III), styrene (IV), cyclopentene (V), and 1-octene (VI). The solvents were cyclohexane for Pd black and 90% EtOH for Pt black. The data show that on Pd black, as on the Ni skeletal catalyst (C.A. 51, 8704e) I is hydrogenated selectively in binary mixts. with II but not in mixts. with IV. The hydrogenation is not selective in mixts. with III in contrast to the data on an Ni catalyst. In the presence of Pt black, I is not hydrogenated selectively in mixts. with V and VI.

J. Rovtar Leach

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SULTANOV, A.S.; FREYDLIN, L.Kh.; ABIDOVA, M.F.

Reduction of aceto- and benzophenone on a zinc-copper catalyst.
Izv. AN. Uz. SSR. Ser. khim. nauk no.4:85-90 '57. (MIRA 11:9)
(Reduction (Chemical)) (Acetophenone) (Benzophenone)

FREYDLIN, L.KH.

USSR/Physical Chemistry - Kinetics, Combustion, Explosions,
Topochemistry, Catalysis.

B-9

Abs Jour : Referat Zhur - Khimiya, No 1, 1958, 507

Author : V.D. Krylov, L.Kh. Freydlin, K.G. Rudneva.

Inst : Academy of Sciences of USSR.

Title : Study of Connection Between Activity and Fine Crystalline
Structure of Powdered Nickel Catalyst.

Orig Pub : Izv. AN SSSR, Otd. Khim. n., 1957, No 5, 546-553

Abstract : A thermal treatment of specimens of powdered Ni-catalyst
in N_2 atmosphere at 300, 450 and 570° of the duration 2
to 8 hours, as well as hydrogen extraction from them at
room temperature does not influence the Fourier factors
computed with the harmonic analysis of profiles of in-
terference lines on x-ray photographs of the above menti-
oned specimens. The mean dimensions of the little

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USSR/Physical Chemistry - Kinetics, Combustion, Explosions,
Topochemistry, Catalysis.

B-9

Abs Jour : Ref Zhur - Khimiya, No 1, 1958, 507

crystals do not change practically in the result of a treatment at 300°, and after a treatment at 450 and 570° they increase 1.7 and 2.1 times correspondingly. The activity of the catalyst in the hydrogenation reaction of vinylphenyl ether in alcohol solution at 20° does not change after a treatment at 300°, but the treatment at 450 and 570° decreases the activity 1.7 and 4 times correspondingly. In the author's opinion, hydrogen takes part in the composition of active centers of powdered Ni and is setting on surfaces confining the little crystals in the process of catalyst formation.

Card 2/2

FREYDLIN L. Kh.

AZATYAN, V.D.; GYULI-KHVKHYAN, R.S.; FREYDLIN, L.Kh.; POLKOVNIKOV, B.D.

Hydrogenation of cyclooctatetraene and its derivatives with a skeleton nickel catalyst. Izv. AN Arm. SSR. Ser. khim. nauk 10 no.1:55-63 '57. (MLRA 10:9)

1. Khimicheskiy institut Akademii nauk Armyanskoy SSR i Institut organicheskoy khimii imeni N.D. Zelinskogo Akademii nauk SSSR.
(Cyclooctatetraene)
(Hydrogenation) (Catalysts)

AUTHORS: Freydlin, L. Kh. 62-11-5/29
Freydlin, L. Kh., Balandin, A. A.,
Fridman, G. A.

TITLE: Investigation of the Vapour-Phase Hydrolysis of
Chlorobenzene Under Presence of a Phosphate Catalyst
(Issledovaniye parofaznogo gidroliza khlorbenzola v
prisutstvii fosfatnogo katalizatora).

PERIODICAL: Izvestiya AN SSSR, Otdelenie Khimicheskikh Nauk, 1957,
Nr 11, pp. 1328-1332 (USSR)

ABSTRACT: Here the reaction of the hydrolysis of the chlorobenzene
in the vapour-phase under presence of phosphate catalysts
was investigated. The activity of a mono-component
phosphate catalyst during absence of "promoters" was
confirmed. The influence of the temperature on the
transformation degree of the chlorobenzene and the
selectivity of the process was investigated. It is shown
that the phosphate catalyst is thermally more stable than
the silica gel catalyst and less sensitive to the
desactivating effect of mineral admixtures. The assumption
is expressed that in the activation process of the

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Investigation of the Vapour-Phase Hydrolysis of
Chlorobenzene Under Presence of a Phosphate Catalyst.

62-11-5/29

hydrolysis reaction in vapour-phase by phosphate and silica
gel catalysts a similarity is existing. There are 3 figures,
4 tables, and 13 references, 12 of which are Slavic.

ASSOCIATION: Institute for Organical Chemistry imeni N. D. Zelinskiy of
the AN USSR (Institut organicheskoy khimii im. N. D.
Zelinskogo Akademii nauk SSSR).

SUBMITTED: July 27, 1956.

AVAILABLE: Library of Congress

Card 2/2

FREYDLIN, L.Kh.; POLKOVNIKOV, B.D.

Sequence in the hydrogenation of cyclopentadiene double bonds on Pd-
and Pt-black. Dokl.AN SSSR 112 no.1:83-85 Ja '57. (MLRA 10:2)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo Akademii nauk
SSSR. Predstavleno akademikom A.A.Balandinym.
(Cyclopentadiene) (Catalysts) (Hydrogenation)

Freydlin, L. Kh.
USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topo-
chemistry, Catalysis.

B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7256.

Author : A.A. Balandin, N.V. Nikiforova, L.Kh. Freydlin.

Inst : Academy of Sciences of USSR.

Title : Kinetics and Sequence of Bond Hydrogenation in Peroxide
Compounds on Nickel Catalyst.

Orig Pub: Dokl. AN SSSR, 1957, 112, No 4, 649-652.

Abstract: The liquid phase hydrogenation of isopropylbenzene hydroperoxide, ethylphenylisopropyl peroxide, tetraline hydroperoxide, 3-methyl-1-butene hydroperoxide, cyclohexene hydroperoxide, benzoyl peroxide, tertiary butylperbenzoate, n-nitrobenzoyl peroxide and di-tertiary butyl peroxide was carried out in ethyl alcohol, benzene and toluene solutions under $p = 1$ atm and at 5 to 30° on Raney's catalyst. It is shown that the hydrogenation sequence of various functional groups in peroxide compounds

Card : 1/2

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Anal. Organic Chem in N.D. Zelinsky

FREYDLIN, L. Kh.

62-2-2/28

AUTHORS: Balandin, A. A. Freydlin, L. Kh.,
Nikiforova, N. V.

TITLE: The Kinetics of the Catalytic Reduction of Peroxides and Hydroperoxides (Kinetika kataliticheskogo vosstanovleniya perekisey i gidroperekisey). Report 2: Hydrogenation of Benzoyl Peroxide, Tertiary Butylperbenzoate and Hydroperoxides of Cyclohexane (Soobshcheniye 2. Gidrirovaniye perekisi benzoila, tretichnobutilperbenzoata i gidroperekisi tsiklogeksana).

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 2, pp. 133-144 (USSR).

ABSTRACT: In the preceding report it was shown by the example of the hydroperoxide of isopropylbenzene, ethylphenylisopropylperoxide and tetralinhydroperoxide that organic peroxide compounds may be easily subjected to hydrogenolysis (over a nickel catalyst). This also corresponds to the multiplet-theory. In the present paper it is shown that only the O — O bond in the compounds breaks (references I and II). The observed lowest stability of this bond on Ni corresponds to the requirements of theory. The authors investigated the

Card 1/2

The Kinetics of the Catalytic Reduction of Peroxides and Hydroperoxides. Report 2: Hydrogenation of Benzoyl Peroxide, Tertiary Butylperbenzoate and Hydroperoxides of Cyclohexane.

62-2-2/28

kinetics of the hydrogenation of benzoyl peroxide and tertiary butylperbenzoate (on Ni) and cyclohexenhydroperoxide (on Ni, Pd and Pt). The authors further determined: the order of reaction of the constants of velocity and the activation energies of the given processes. The hydrogenation of the peroxides can be used as catalytic method for the production of unsaturated alcohols. There are 6 figures, 1 table, and 17 references, 9 of which are Slavic.

ASSOCIATION: Institute for Organic Chemistry imeni N. D. Zelinskiy AN USSR (Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: October 16, 1956

AVAILABLE: Library of Congress

1. Peroxides-Reduction
2. Hydroperoxides-Reduction
3. Peroxides-Hydrogenation

Card 2/2

AUTHORS: Freydlin, L. Kh., Balandin, A. A., Fridman, G. A. 62-2-3/28

TITLE: The Vapor-Phase Hydrolysis of Benzene Halides on an Activated Phosphate Catalyst. (Parofaznyy gidroliz galoibenzolov na promotirovannom fosfatnom katalizatore).

PERIODICAL: Izvestiya AN SSSR Otdeleniya Khimicheskikh Nauk, 1958, Nr 2, pp. 145-151 (USSR).

ABSTRACT: It was shown that the three-substituted phosphate of calcium is suitable as active and stable one-component catalyst of the reaction of the vapor-phase hydrolysis of chlorobenzene. It was assumed that the type of activity of the two catalysts is very similar. The similarity of the mechanism of the activating action of silicagel and phosphate is also confirmed by the fact that the reactivity of chloro-, bromo- and iodobenzenes uniformly decreases on both catalysts (in the order C_6H_5Cl C_6H_5Br C_6H_5I). The investigation showed that the reaction of the hydrolysis of chlorobenzene in 3-substituted calcium phosphate is activated on copper chloride. It was found that the reactivity of benzene halides in the investigated reaction decreases to the same extent as on silicagel. The problem of the correlation between general and active surface in

Card 1/2

The Vapor-Phase Hydrolysis of Benzene Halides on an Activated
Phosphate Catalyst.

62-2-3/28

the silicagel- and phosphate-catalyst was discussed. Further-
more the number of active parts in the catalyst was determined.
There are 5 figures, 5 tables, and 13 references, 11 of which
are Slavic.

ASSOCIATION: Institute for Organic Chemistry imeni N.D. Zelinskogo AN
USSR (Institut organicheskoy khimii imeni N.D. Zelinskogo
Akademii nauk SSSR).

SUBMITTED: October 16, 1956

AVAILABLE: Library of Congress

1. Benzene halides-Hydrolysis
2. Silacagel catalyst
3. Calcium phosphate catalyst

Card 2/2

AUTHORS: Freydlin, L. Kh., Sultanov, A. S., Abidova, M. F. 62-58-3-28/30

TITLE: Investigation of Catalyst Activity (Issledovaniye izbiratel'nosti deystviya katalizatorov). Report I. The Reduction of the Mesithyl Oxide and of Croton Aldehyde on a Zinc Catalyst (Soobshcheniye I. Vosstanovleniye okisi mezitila i krotonovogo al'degida na tsinkovom katalizatore)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk, 1958, Nr 3, pp.378-380 (USSR)

ABSTRACT: The authors found that skeleton zinc under atmospheric pressure develops an important catalytic activity within the reduction reactions of aldehydes and ketones (in alcohols). In the hydrogenation of unsaturated compounds, however, skeleton zinc is inert. It is reported that the zinc catalyst in C-O and C-C compounds contained in the same molecule has the same selectivity. By means of the example of mesithyl and croton-aldehyde the authors found that: a zinc contact has the same properties of catalyzing the reduction of the carbonyl group under atmospheric pressure and at low temperatures. The binary compound C-C is not affected in this. At high temperatures the reaction is complicated in

Card 1/2

Investigation of Catalyst Activity. Report I. The Reduction of the Mesithyl Oxide and of Croton Aldehyde on a Zinc Catalyst. 62-58-3-28/30

consequence of the isomerization process (unsaturated alcohol in saturated ketone). There are 1 figure, 2 tables, and 3 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N.D.Zelinskogo Akademii nauk SSSR (Institute for Organic Chemistry imeni N. D. Zelinskiy, AS USSR)

SUBMITTED: December 10, 1957

Card 2/2

FREYDLIN, L.Kh.; ABIDOVA, M.F.; SULTANOV, A.S.

Thermal stability, deactivation, and regeneration of a zinc-copper catalyst. Uzb. khim. zhur. no.4:41-44 '58. (MIRA 11:12)

1. Institut organicheskoy khimii imeni I.D. Zelinskogo AN SSSR,
Institut khimii AN UzSSR.
(Catalysts) (Aluminum-copper-zinc alloys)

FREYDLIN, L. Kh

AUTHORS:

Freydlin, L. Kh., Abidova, M. F.,
Sultanov, A. S.

62-58-4-17/32

TITLE:

Mechanism of the Reduction of Allyl Alcohol
on Zinc and Zinc-Copper Catalysts (Mekhanizm vossta-
novleniya allilovogo spirta na tsinkovom i tsink-med-
nom katalizatorakh)

PERIODICAL:

Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh
Nauk, 1958, Nr 4, pp. 498-500 (USSR)

ABSTRACT:

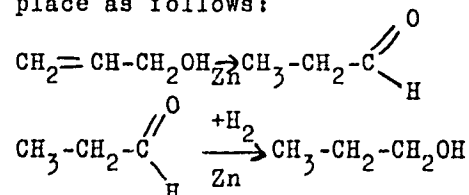
Metallic zinc has an high catalytic activity in the
reactions of aldehydes and ketones with hydrogen (at
atmospheric pressure and at temperatures of from 50-
150°). The binary binding $-C\equiv C-$ binding (like hexene,
cyclohexene) can not be hydrated on these conditions.
In the investigation of the reduction of allyl alcohol
on this catalyst the authors found that allyl alcohol
converted into propyl alcohol already at 75°C. In the
case of a raise of temperature propionaldehyde formed
simultaneously with alcohol. This fact lead to the con-
sideration that in the given process hydrogen does not

Card 1/3

Mechanism of the Reduction of Allyl
Alcohol on Zinc and Zinc-Copper Catalysts

62-58-4-17/32

follow the $-C \equiv C$ -binding and therefore the reaction must take place as follows:



In order to check this assumption a series of experiments was carried out in which only the isomerisation reaction could take place. As was to be expected proionaldehyde formed of allyl alcohol because of the lack of hydrogen. It showed that the isomerisation stage surpassed the reduction stage. Furthermore it was found that in both reactions the zinc-copper catalyst was more active than the zinc catalyst.

There are 2 tables and 2 references, 1 of which is Soviet.

Card 2/3

Mechanism of the Reduction of Allyl
Alcohol on Zinc and Zinc-Copper Catalysts

62-58-4-17/32

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
Akademii nauk SSSR (Institute for Organic Chemistry
imeni N. D. Zelinskiy AS USSR)

SUBMITTED: October 28, 1957

AVAILABLE: Library of Congress

1. Zinc catalysts--Allyl alcohol--Reduction 2. Zinc
copper catalysts--Allyl alcohol--Reduction

Card 3/3

AUTHORS: Freylin, L. Kh., Sultanov, A. S., 62-58-5-21/27
Abidova, M. F.

TITLE: Investigation of the Efficiency-Selectivity of the Catalysts
 (Issledovaniye izbiratel'nosti deystviya katalizatorov)
 Communication 2. Reduction of Mesityl-Monoxide on Copper -
 and Zinc-Copper Catalysts (Soobshcheniye 2. Vosstanovleniye
 okisi mezitila na mednom i tsink-mednom katalizatorakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk,
 1958, Nr 5, pp. 640-642 (USSR)

ABSTRACT: Zinc has a rare property: Under atmospheric pressure it cata-
 lyzes - in the case of reduction reaction - the C-O-bond with-
 out influencing the C-C-bond. In accordance with this a re-
 duction of the allyl-alcohol on this catalyst does not take
 place immediately, but by way of the intermediary formation
 of propionic aldehyde. The zinc-copper-catalysts behaves in the
 same way in a given reaction. Therefore it was possible to
 assume that the latter-analogous to the zinc-catalyst- selec-
 tively hydrates the carbonyl-bond in the presence of the ethy-
 lene-bond. The following result was obtained by the investi-
 gation: the zinc-copper-contact catalyzes selectively the

Card 1/2

Investigation of the Efficiency-Selectivity of the Catalysts. Communication 2. Reduction of Mesityl-Monoxide on Copper- and Zinc-Copper Catalysts 62-58-5-21/27

hydration of the C=O-bond in mesityl-monoxide, yet it remains inert with respect to the hydration of the C=C bond. The hydration on a copper-catalyst takes place just viceversa. 2-methyl-2-pentenol-4 cannot isomerize at 125° on a copper-catalyst. The efficiency-selectivity of the zinc-copper catalyst is determinable according to its zinc-component. Compared with the zinc-catalyst, a low activity of the reaction of isomerization of the unsaturated alcohol into a saturated ketone is caused by the presence of copper in the catalyst. There are 2 figures, 2 tables, and 2 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk SSSR (Institute for Organic Chemistry imeni N.D. Zelinskiy AS USSR)

SUBMITTED: December 30, 1957

Card 2/2 1. Zinc--Catalytic properties 2. Copper--Catalytic properties
3. Mesityl monoxide--Oxidation--reduction reactions

SOV/62-58-8-2/22

AUTHORS:

Freydlin, L. Kh., Balandin, A. A., Borunova, N. V.,
Agronomov, A. Ye.

TITLE:

On the Relation Between the Activity and Stability of Nickel-Aluminium Catalysts and the Macro-Structure of the Carrier
(O svyazi mezhdru aktivnost'yu i stabil'nost'yu nikel'-glinozemnykh katalizatorov i makrostrukturoy nositelya)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 8, pp. 923-928 (USSR)

ABSTRACT:

In the introduction the authors briefly discuss the influence of the macrostructure of the carrier on the activity of the nickel-aluminium catalyst (Refs 1-3). Then they describe their investigation of the relation between the activity and stability of nickel-aluminium catalysts on the one hand, and the character of the macro-structure of aluminium oxide on the other hand. This investigation showed that the dehydrating activity of the catalyst can mainly be recognized by the type of porosity of the carrier. It was found that catalysts produced by the application of nickel on coarse-porous aluminium oxide have a higher activity and greater stability than those produced by the application

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SOV/62-58-8-2/22
On the Relation Between the Activity and Stability of Nickel-Aluminium
Catalysts and the Macro-Structure of the Carrier

of nickel on fine-porous aluminium oxide. The latter has the effect that the activity of the catalyst is considerably reduced. There are 4 figures, 1 table, and 10 references, 9 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy, AS USSR)

SUBMITTED: March 5, 1957

Card 2/2

AUTHORS: Freydlin, L. Kh; Sharf, V. Z.

SOV/62-58-10-17/25

TITLE: Hydrolytic Cleavage of Mesityl Oxide and Dealdolization of Diacetone Alcohol on Trisubstituted Calcium Phosphate (Gidroliticheskoye rasshchepleniye okisi mezitila i deal'dolizatsiya diatsetonovogo spirta na trekhzameshchennom fosfate kal'tsiya)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 10, pp 1264 - 1270 (USSR)

ABSTRACT: In the course of the last years the idea of the possibility of the formation of unstable intermediate surface compounds in the heterogeneous catalysis has become more and more popular. For this reason a great similarity between the mechanism of the homogeneous and heterogeneous catalytic reactions may be assumed. From this point of view the authors investigated the reactions of the hydrolytic cleavage of mesityl oxide and the dealdolization of diacetone alcohol on trisubstituted calcium phosphate. It was found that calcium phosphate (as in the H^+ and OH^- ions) selectively catalyzes the reaction in the vapor phase of the hydrolytic

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Hydrolytic Cleavage of Mesityl Oxide and Dealdolization of Diacetone Alcohol on Trisubstituted Calcium Phosphate SOV/62-58-10-17/25

cleavage of mesityl oxide to acetone. It was also found that the dealdolization of diacetone alcohol on this catalyst takes place more complete and under milder conditions than the hydrolytic cleavage of mesityl oxide. The results of the investigation show that the hydrolytic cleavage of mesityl oxide on a solid catalyst takes place by way of the hydration stage, thus limiting the general velocity of the course of the process. There are 5 figures, 4 tables, and 11 references, 9 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im.N.D.Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N.D. Zelinskiy AS USSR)

SUBMITTED: March 5, 1957
Card 2/2

AUTHORS: Nazarova, N. M., Balandin, A. A., SCV/20-121-5-28/50
Member, Academy of Sciences, USSR, Freydlin, L. Kh.

TITLE: Catalytic Alkylation of n-Butane by Means of Ethylene at High
Temperatures and High Pressures (Kataliticheskoye
alkilirovaniye n-butana etilenom pri vysokikh temperaturakh
i davleniyakh)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 5,
pp. 865-868 (USSR)

ABSTRACT: The authors already previously found (Refs 1 - 3) that a cata-
lytic alkylation of normal paraffin hydrocarbons by olefins
is possible at increased temperatures (450°), and increased
pressure (500 atmospheres of excess pressure). This work is a
continuation of those referred to above. The tests were
carried out under flow conditions. The equipment, the methods
of both test and analyses have been described already pre-
viously (Ref 1). The results have shown that the reaction re-
ferred to in the title yields a complicated mixture of hydro-
carbons. The expected hexane fraction (affiliation product of
butane to ethylene) was more considerable than the other

Card 1/3

Catalytic Alkylation of n-Butane by Means of
Ethylene at High Temperatures and High Pressures

SOV/20-121-5-28/50

fractions of the alkylate, whereas the number of their isobutylene bonds was considerably smaller than that of other fractions. Table 1 gives the test results, yields of alkylates and the characteristic of the obtained fractions. Approximately one half (51.9 volume percent) could be distilled off up to 125°. It follows from the test results that ethylene is mainly affiliated to the 2nd C-atom of butane and that it forms 3-methyl pentane. There is less affiliation to the first C-atom and n-hexane is formed. During the alkylation hydrocarbons boiling at higher temperatures are also formed besides those to be expected. It could be assumed that they are mainly products obtained by a re-alkylation of the developed 3-methyl pentane (Fig 1, II). The affiliation in this stage, however, takes place mainly to the first and not to the 2nd C-atom. Yu.P. Yegorov and G.K. Gayvoronskaya have recorded the spectra of the fraction and deciphered them. A.I. Paliy and V.N. Zharov took part in this work. There are 2 figures, 2 tables, and 7 references. 5 of which are Soviet.

Card 2/3

Catalytic Alkylation of n-Butane by Means of
Ethylene at High Temperatures and High Pressures

SOV/20-121-5-28/50

ASSOCIATION: Institut organicheskoy khimii im. N.D. Zelinskogo Akademii
nauk SSSR (Institute of Organic Chemistry imeni N.D.
Zelinskiy, AS USSR)

SUBMITTED: April 26, 1958

Card 3/3

FREYDLIN, L.Kh.; SHARF, V.Z.

Producing cyclohexanone of caprolactam-production waste. Biul.
tekhn.-ekon.inform. no.1:16-17 '59. (MIRA 12:2)
(Cyclohexanone) (Hexamethylenimine)

5(3)

AUTHORS:

Freydlin, L. Kh., Polkovnikov, B. D.

SOV/62-59-4-25/42

TITLE:

Irreversible Catalysis and Consecutive Hydrogenation of Unsaturated Bonds of 1,3-Cyclohexadiene on the Skeleton Nickel Catalyst (Neobratimyy kataliz i posledovatel'nost' gidrirovaniya nepredel'nykh svyazey tsiklogeksadiyena-1,3 na skelotnom nikel'evom katalizatore)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 4, pp 721-726 (USSR)

ABSTRACT:

It has been shown recently (Ref 7) that the unsaturated bonds of 1,3-cyclohexadiene hydrogenate consecutively in the presence of Pd and Pt black. At the same time the reaction of the irreversible catalysis up to cyclohexene and benzene takes place at a high reaction rate. The results determined in the present paper show that in the presence of skeleton nickel, cyclohexadiene is changed in the same direction. The experimental method, the preparation of cyclohexadiene as well as its qualitative determination have already been described in reference 7. 1,3-cyclohexadiene was hydrogenated in the presence of skeleton nickel at 25°. 96° ethyl alcohol and n-heptane were used as solvents. The results obtained with

Card 1/3

Irreversible Catalysis and Consecutive Hydrogenation SOV/62-59-4-25/42
of Unsaturated Bonds of 1,3-Cyclohexadiene on the Skeleton Nickel Catalyst

hydrogenation in 96° ethyl alcohol are shown in table 1 and figures 1 and 2. It was found that in the presence of skeleton nickel on Pd and Pt an irreversible catalysis of cyclohexadiene takes place in addition to the hydrogenation. With the irreversible catalysis benzene and cyclohexene are formed. Since cyclohexene hydrogenates under the experimental conditions and in connection with it absorbs the quantity of hydrogen theoretically required, no irreversible catalysis takes place in this case. Benzene is not hydrogenated on skeleton nickel at 25°. Thus the benzene and cyclohexadiene quantities can be determined from the difference between the hydrogen volume necessary in theory and the one actually used; and the transition degree of the weighed portion of cyclohexadiene can be determined from the benzene and cyclohexadiene quantities. The results obtained with hydrogenation in n-heptane are shown in figure 3. It was found that cyclohexadiene, too, hydrogenates at a high rate in n-heptane. The hydrogenation is accompanied by an irreversible catalysis. It was found that the hydrogenation takes place in two stages: first cyclohexene is formed and then cyclohexane. If

Card 2/3

Irreversible Catalysis and Consecutive Hydrogenation SOV/62-59-4-25/42
of Unsaturated Bonds of 1,3-Cyclohexadiene on the Skeleton Nickel Catalyst

cyclohexadiene is mixed with cyclohexene it is hydrogenated selectively up to cyclohexene. The hydrogenation is accompanied by the irreversible diene catalysis in benzene and cyclohexene. The ratio of the reaction rates on nickel is $\sim 1 : 1.5$, i.e. it is half way between Pd and Pt black. Moreover, it was found that alcohol and n-heptane do not influence the direction of the reaction process. In the presence of pyridine cyclohexadiene is hydrogenated only up to cyclohexene because the catalyst is poisoned by pyridine. There are 4 figures, 1 table, and 16 references, 5 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: July 12, 1957

Card 3/3

5(3)
 AUTHORS: Freydlin, L. Kh., Polkovnikov, B. D., SOV/62-59-5-23/40
 Yegorov, Yu. P.

TITLE: Consecutive
 /Hydrogenation Sequence of the Double Bonds of
 Cyclohexadiene-1,3 and Its Irreversible Catalysis
 on Pt- and Pd-Blacks (Posledovatel'nost' gidrirovaniya
 dvoynnykh svyazey tsiklogeksadiyena-1,3 i yego neobratimyy
 kataliz na Pt- i Pd-chernyakh)

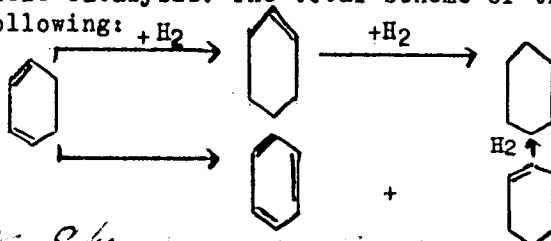
PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,
 1959, Nr 5, pp 910-915 (USSR,

ABSTRACT: The process of the hydrogenation of cyclohexadiene mentioned
 in the title has not yet been completely investigated.
 Zelinskiy and Pavlov (Ref 6) were the first to find
 out that it develops in two stages:
 1) $2 \text{C}_6\text{H}_8 \rightarrow \text{C}_6\text{H}_6 + \text{C}_6\text{H}_{10}$ 2) $3 \text{C}_6\text{H}_{10} \rightarrow \text{C}_6\text{H}_6 + 2 \text{C}_6\text{H}_{12}$,
 the second stage developing much more slowly than the first.
 In this paper this process is investigated under conditions
 which render the simultaneous hydrogenation and irreversible
 catalysis possible. It is found that in the presence of

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 2

Consecutive
/Hydrogenation Sequence of the Double Bonds of SOV/62-59-5-23/40
Cyclohexadiene-1,3 and Its Irreversible Catalysis on Pt- and Pd-Blacks

Pt- and Pd-black in alcohol and in n. heptane at 25° the unsaturated bonds of cyclohexadiene-1,3 are hydronized in stages. First, the entire cyclohexadiene-1,3 is converted into cyclohexane, and then hydrogen is linked on with the formation of cyclohexene. This formation is accompanied by hydrogen distributing reaction with the formation of cyclohexene and benzene (irreversible catalysis). The individual reaction data of the hydrogenation mentioned are shown in a table. The conditions of the reaction rates hydrogenation and irreversible catalysis depend on the nature of the catalyst (Figs 1, 2). In the presence of Pt-black the hydrogenation reaction predominates, and in Pd-black the irreversible catalysis. The total scheme of the reactions is the following:



Card 2/3

2 Inst. Org. Chem. in N. S. Leningrad, 75 USSR

5 (4)

AUTHORS:

Balandin, A. A., Freydlin, L. Kh.,
Nikiforova, N. V.

SOV/62-59-7-5/38

TITLE:

Kinetics of the Catalytic Reduction of Peroxides and Hydroperoxides (Kinetika kataliticheskogo vosstanovleniya perekisey i gidroperekisey). Communication 3. Hydrogenation of 3-Hydroperoxide-3-methyl-1-butene and of the Paranitrobenzoyl Peroxide (Soobshcheniye 3. Gidrirovaniye 3-gidroperekisi-3-metil-1-butina i perekisi paranitrobenzoila)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 7, pp 1177-1185 (USSR)

ABSTRACT:

In this paper the successive hydrogenation of the groups $C\equiv C$, $O-O$, $N=O$, $C=C$ was investigated by the catalytic reduction of the compounds (I) and (II) mentioned in the title. From the energy principles of the multiple theory (Ref 2) it follows that the reduction with the lowest energy barrier begins as the first reaction. The height of the energy barrier can be calculated from the binding energy between the atoms reacting in catalysis. In the reduction of (I) the groups $O-O$ and $C\equiv C$ and the groups $C=C$, $C-O$ and $C-C$ being formed in the course of the reaction compete in this regard. The energy barriers of the individual

Card 1/4
2

Kinetics of the Catalytic Reduction of Peroxides and SOV/62-59-7-5/38
Hydroperoxides. Communication 3. Hydrogenation of 3-Hydroperoxide-3-methyl-1-
butine and of the Paranitrobenzoyl Peroxide

bonds calculated from the average binding energy of the reacting
atoms are:

O-O, $-E_1 = -14.2$ kcal/mol

C≡C, $-E_3 = -6.4$ "

C=C, $-E_2 = 2.9$ "

C-O, $-E = 17$ "

C-C, $-E = 48$ "

The first reduction thus begins on the O-O bond. The values $-E$
of (II) for the bond O-O, N=O or N-O are:

N-O, $-E_4 = -28.3$ kcal/mol | C≡C_{benz} $-E = 20$ kcal/mol

O-O, $-E_1 = -14.2$ " | C-C_{aliph} $-E = 48$ "

The numeric values of the binding energies were taken from the
paper, reference 3. The sequences of the hydrogenation reactions
may be seen from the values $-E$. The experimental data obtained
gave the proof of the supposed sequence of the reduction of the
single binding groups in the compounds (I) and (II). A nickel

Card 2/4
3

Kinetics of the Catalytic Reduction of Peroxides and Hydroperoxides. Communication 3. Hydrogenation of 3-Hydroperoxide-3-methyl-1-butene and of the Paranitrobenzoyl Peroxide SOV/62-59-7-5/38

catalyst was used for the investigation. The kinetics and the sequence of the hydrogenation of the bonds (Fig 1), the influence of the temperature on the hydrogenation rate (Figs 2, 6), the activating energy (Figs 3, 7) and the hydrogenation kinetics in the presence of palladium, (Fig 4, a, b) were investigated. The data of the hydrogenation kinetics of bifunctional peroxide compounds on skeleton nickel are given in a table for comparison. The sequence of the hydrogenation reaction depends also on the kind of catalyst. On a platinum catalyst the acetylene bond is hydrogenated first and the O-O bond afterwards. A strict selectivity is only to be noticed when hydrogenating the triple- and double bond. There are 7 figures, 1 table, and 14 references, 8 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

Card 3/4

Submitted Oct '57

5 (3)

AUTHORS:

Polkovnikov, B. D., Freydlin, L. Kh.,
Balandin, A. A.

SOV/62-59-8-27/42

TITLE:

Selective Hydrogenation of the Dinitrile of Adipic Acid on a
Cobaltboride Catalyst

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,
1959, Nr 8, pp 1488-1490 (USSR)

ABSTRACT:

The hydrogenation of the dinitrile of adipic acid usually proceeded very badly on the catalysts used so far on account of the formation of by-products (secondary amines) inhibiting the reaction (Refs 1-3). The authors therefore in the present paper used the catalyst Co_2B for the activation of the reaction

mentioned above and investigated its effectiveness. The catalytic properties of Co_2B had so far not been described in literature.

The catalyst was prepared according to the method (Ref 5) used for nickel borides. The hydrogenation was carried out in a rotary autoclave. The results of the investigation are collected in the table and figures. The experiments were made in the presence of ammonia as well as without ammonia. The high hexamethylenediamine yields in the absence of ammonia (71-83.6%)

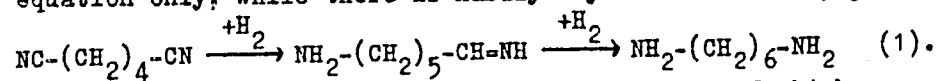
Card 1/3

2

Selective Hydrogenation of the Dinitrile of Adipic
Acid on a Cobaltboride Catalyst

SOV/62-59-8-27/42

were even increased to 89% when ammonia was present. The use of larger amounts of ammonia did, however, not increase the yield above that level. The formation of secondary amines, which is considerably accelerated on a nickel skeleton catalyst at 80-100°, has no effect as yet upon the diamine yield on Co₂B at 125°. Furthermore the effect of the amount of catalyst used upon the reaction direction was investigated. It was found that a change in this amount has no effect upon the yield so that a continuously operating apparatus may be used for the reaction as well. The investigation results suggest that on Co₂B the reaction is selective and takes place according to the following equation only, while there is hardly any formation of by-products:



There are 1 figure, 1 table, and 7 references, 4 of which are Soviet.

Card 2/3

End of document

5 (3)

AUTHORS:

Freydlin, L. Kh., Balandin, A. A.,
Zhukova, I. F., Yakovlev, I. P.

SOV/62-59-9-20/40

TITLE:

Investigation of the Selective Effect of Catalysts. Communication 3. Hydration of Isoprene on a Skeleton Nickel Catalyst

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, pp 1640 - 1645 (USSR)

ABSTRACT:

The hydration of isoprene on a skeleton nickel catalyst was investigated without (Fig 1) and with the addition of pyridine (Fig 2), and under pressure. The step-by-step hydration of the isoprene was established by determining the diene content in the catalyst before and after the consumption of 1 mol of hydrogen. After consumption of 1 mol of H no diene could be detected in the catalyst, which confirms the stepwise hydration. The diene was determined according to B. N. Afanas'yev (Ref 6) or A. Baeyer (Ref 7). The authors found that the step-by-step hydration occurs as well with as without pyridine and that at experiments with small quantities of pyridine the reaction proceeds only to the formation of monocolefines. The influence of the quantity pyridine/catalyst surface and the influence isoprene/catalyst surface (Tables 3,4) was investigated concerning Ni + pyridine

Card 1/2

Investigation of the Selective Effect of Catalysts.
Communication 3. Hydration of Isoprene on a Skeleton
Nickel Catalyst

SOV/62-59-9-20/40

and found that an excess of pyridine hinders the isoprene hydration. The analysis of the reaction products of the Ni + pyridine experiment was carried out with the Raman spectrum. The two isomer substances 2-methylbutane-1 and 2-methylbutane-2 were present in the catalyzate. At variations of the pressure the selective effect of pyridine remained up to a pressure of 80 atm. Quinoline has the same effect as pyridine. There are 2 figures, 5 tables, and 9 references, 6 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk
SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of
the Academy of Sciences, USSR)

SUBMITTED: December 20, 1957

Card 2/2

SOV/62-59-9-32/40

5(3),5(4)
AUTHORS: Freydlin, L. Kh., Gorshkov, V. I., Lavrovskaya, T. K.

TITLE: Selective Hydrogenation of Acetylene Bonds Conjugated to Ethylene Bonds on a Zinc Catalyst

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, pp 1679-1681 (USSR)

ABSTRACT: In the present paper the catalytic properties of zinc in reactions of conjugated double bond systems are investigated. The following compounds are investigated: Isoprene, piperylene, vinyl- and isopropenylacetylene. The method of investigation and preparation of catalysts are described in reference 3. The course of the reaction was determined by means of the number of moles H_2 consumed. At normal pressure and temperatures between 60 and 140° isoprene could not be hydrogenated. Thus it is concluded that the hydrogenation reaction on zinc catalysts does not proceed beyond a system of conjugated double bonds. The reaction products were analyzed by means of gas-liquid chromatography. Chromatographs and analytical data are given in figures and in table 1. The zinc catalyst proved strictly selective. Vinylacetylene was hydrogenated only to divinyl, butane and butene were not formed.

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Selective Hydrogenation of Acetylene Bonds Conjugated to Ethylene Bonds on a Zinc Catalyst SOV/62-59-9-32/40

By a side reaction, polymers formed, owing to the rapid deactivation of the catalyst. A 75% yield was obtained under optimum conditions (80°, 93.9% H₂, 6.1% vinylacetylene). On a Zn-Cu catalyst vinylacetylene was hydrogenated down to butane. Results and experimental conditions for the hydrogenation of isopropenylacetylene are given in table 2. Isoprene was the final product. There are 1 figure, 2 tables, and 7 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: February 27, 1959

Card 2/2

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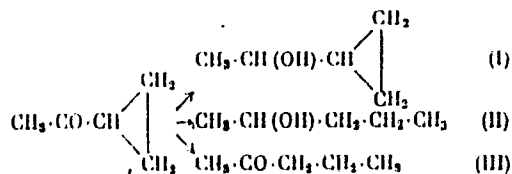
SOV/62-59-12-32/43

AUTHORS: Freydlin, L. Kh., Meshcheryakov, A. P., Gorshkov, V. I., and Glukhovtsev, V. G.

TITLE: Brief Communication. Selective Reduction of Methyl Cyclopropyl Ketone Over the Zinc Catalysts

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2237-2239 (USSR)

ABSTRACT: In catalytic reduction of methyl cyclopropyl ketone, two groups can be reduced: the carbonyl group and the trimethylene ring:



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The authors have found that Zn and Zn-Cu catalysts

Brief Communication. Selective Reduction of
Methyl Cyclopropyl Ketone Over the Zinc
Catalysts

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(in the temperature interval 80-160° and 130 atm pressure) cause selective reduction of the carbonyl group, according to path (I) of the above equation, while Cu catalysts first cause (at 80°) hydrogenation of the trimethylene ring (path III). 2-Pentanol is formed above 125°. This behavior of methyl cyclopropyl ketone during catalytic reduction is similar to the reduction of α, β -unsaturated ketones (and aldehydes). There are 2 figures; 2 tables; and 10 references, 7 Soviet, 3 U.S. The U.S. references are: V. A. Slabey, P. H. Wise, J. Am. Chem. Soc., 71, 3252 (1949); R. V. Volkenburgh, K. W. Greenlee, J. M. Derfer, C. E. Boord, J. Am. Chem. Soc., 71, 3595 (1949); W. F. Bruce, G. Mueller, J. Seifter, J. L. Szabo, U. S. Pat. 2494084, Chem. Abstr., 45, 177 (1951).

ASSOCIATION:

N. D. Zelinskiy Institute of Organic Chemistry of
the Academy of Sciences, USSR (Institut organicheskoy

Card 2/3

2-

Brief Communication. Selective Reduction of
Methyl Cyclopropyl Ketone Over the Zinc
Catalysts

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khimi1 imeni N. D. Zelinskogo Akademii nauk SSSR)

SUBMITTED: May 4, 1959

Card 3/3

5(3)

SOV/79-29-5-2/75

AUTHORS:

Borunova, N. V., Balandin, A. A., Freydlin, L. Kh.

TITLE:

On the Selectivity of the Action of Applied Nickel-Aluminum Oxide Catalysts (O selektivnosti deystviya nanesennykh nikel'-glinozemnykh katalizatorov)

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 5,
pp 1409 - 1412 (USSR)

ABSTRACT:

It was found previously (Ref 1) that it is possible to obtain a nickel-aluminum oxide catalyst by the reduction of a mixture of nickel monoxide and aluminum oxide which was formed by common precipitation and treatment with water vapors under pressure. In the presence of such a catalyst the double bonds C=C and C=O are hydrogenated, but not the aromatic bonds. In the present paper the authors investigated the selectivity of such catalysts which were obtained from nickel monoxide applied on aluminum oxide and treated with water vapor or carbon dioxide. The catalysts applied prepared by treatment with water vapors were found to hydrogenate selectively the ethylene bond of octene-3 or styrene in the presence of an aromatic bond (Table 1). It was shown to be possible to regulate the activity of the catalysts obtained

Card 1/2

On the Selectivity of the ~~Action~~ of Applied Nickel-Aluminum Oxide Catalysts

SOV/79-29-5-2/75

by treating the mixture of nickel monoxide and aluminum oxide with carbon dioxide under pressure and to give them a specific efficiency (Table 2). The inactivation of the catalyst by treatment with carbon dioxide was proved to be reversible in contrast with the steam treatment. There are 2 tables and 4 Soviet references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR (Institute of Organic Chemistry of the Academy of Sciences, USSR)

SUBMITTED: May 6, 1958

Card 2/2

5(3)

SOV/80-32-4-35/47

AUTHORS: Freydlin, L.Kh., Sharf, V.Z. and Smolyan, Z.S.

TITLE: On the Composition of the Products of Dehydrogenation of Cyclohexanol on a Zinc Catalyst and on the Transformation of the Obtained Vat Residue Into Cyclohexanone (O sostave produktov degidrirovaniya tsiklogeksanola na tsinkovom katalizatore i o prevrashchenii poluchayushchegosya kubovogo ostatka v tsiklogeksanon)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 4, pp 901-905 (USSR)

ABSTRACT: The authors studied the composition of the products obtained in the industrial process of dehydrogenation of cyclohexanol on a zinc catalyst and found out that the yield of the latter amounted to 80 or 85%. The amount of cyclohexanol which did not react was 10 to 15%. In addition to these, in the products of the reaction were discovered the following substances: cyclohexene in an amount of 0.3 to 0.5%, water - 0.1 to 0.2%, phenol - 0.1 to 0.15%, cyclohexyl ether - 0.02 to 0.03%, and cyclohexylidencyclohexanone-2 in an amount of 0.5 to 1%. The latter constitutes about 50% of the vat waste which can be transformed into

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SOV/80-32-4-35/47

On the Composition of the Products of Dehydrogenation of Cyclohexanol on a Zinc Catalyst and on the Transformation of the Obtained Vat Residue Into Cyclohexanone

cyclohexanone up to a degree of 40% by means of hydrolytic decomposition. An analogous result was also obtained in an installation of continuous operation, which is illustrated and described in the article.

There are: 1 table, 1 diagram and 13 references, 5 of which are Soviet, 3 American, 3 German and 2 Japanese.

SUBMITTED: July 26, 1957

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5.3200(A)
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66863

5(4)

SOV/76-33-11-18/47

AUTHORS:

Balandin, A. A., Freydlin, L. Kh., Nikiforova, N. V.

TITLE:

The Kinetics of Selective Catalytic Hydrogenation¹ of Bifunctional Peroxides and Hydrogen Peroxides on Nickel. Prediction of Reactions on the Basis of the Multiplet Theory

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 11, pp 2485-2489 (USSR)

ABSTRACT:

Due to the explanations of Kottrell (Ref 1) on the binding energy, it was recently possible to determine the value of the energy of the peroxide bond $-O-O-$. Now it became possible to calculate the relative ease of hydrogenolysis of this bond on the nickel catalyst with the aid of energy equations of the multiplet theory (if the quantities required are known). The calculation showed that the height of the energy barrier, which determines the reaction rate is: $-E'' = -14.2$ kcal/mol (Table). This table also contains the values of E for the hydrogenation of various bonds on nickel, which were obtained with the aid of equations of the multiplet theory. The equations (2) express the formation energy E' and the decomposition energy E'' of a multiplet complex M as a function of the binding energy Q . The

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The Kinetics of Selective Catalytic Hydrogenation of Bifunctional Peroxides and Hydrogen Peroxides on Nickel. Prediction of Reactions on the Basis of the Multiplet Theory

multiplet theory predicts (Table, Equation (2)) that: 1) the peroxide compounds are easily hydrogenated on nickel; 2) the activation energy of these reactions is low; 3) the molecule structure influences the hydrogenation rate; 4) polyfunctional peroxides must follow a certain order of reaction in hydrogenation on nickel (Table); 5) this order may change with other catalysts. To check these predictions the authors experimentally tested the hydrogenation of isopropyl benzene hydrogen peroxide, ethyl phenyl isopropyl peroxide, tetralin hydrogen peroxide, benzoyl peroxide, tert-butyl-perbenzoate, di-tert-butyl peroxide, cyclohexene hydrogen peroxides, 3-hydrogen peroxides of 3-methyl-1-butene and the peroxide of n-nitrobenzene. They further determined the activation energy. All of the above-mentioned predictions made according to the multiplet theory were confirmed by experimental data. There are 1 table and 5 Soviet references.

ASSOCIATION: Akademiya nauk SSSR, Institut organicheskoy khimii im. N. D. Zelinskogo (Academy of Sciences, USSR, Institute of Organic Chemistry imeni N. D. Zelinskiy)

Card 2/2

5.1190
5(4)

AUTHORS:

Krylov, V.D., Freydlin, L.Kh.,
Zhukova, I.F.

66870

SOV/76-33-11-32/47

TITLE:

Investigation of the Influence of Water Vapor on the Activity
and Structure of the Skeleton Nickel Catalyst

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 11, pp 2559-2563
(USSR)

ABSTRACT:

The treatment of a skeleton nickel catalyst with water vapor under pressure caused already at low temperatures a decrease in activity. It was assumed (Ref 3) that the decrease in activity is caused by a recrystallization of the catalyst. Therefore the authors investigated the fine-crystalline structure and catalytic activity of skeleton nickel (treated with water vapor under pressure), the structure and activity of nickel (reduced from NiO) and the structure of NiO itself. The fine-crystalline structure was examined according to the harmonic analysis of the interference lines in x-ray pictures and according to the integral semi-width of the lines. The latter were determined with an x-ray diffractometer type URS-50I. The size of the crystal aggregate was determined with the equation of Selyakov-Scherrer. The NiO obtained by

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Investigation of the Influence of Water Vapor
on the Activity and Structure of the Skeleton
Nickel Catalyst

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oxidation of the skeleton nickel, was treated under pressure at 250, 215, 200, 180 and 150°C with water vapor (Table), subsequently reduced with hydrogen and the activity was investigated at the hydrogenation of vinyl phenyl ether in 96% ethanol at 20°C. The irreversible decrease in the catalyst activity observed is not caused by the growth of the crystal aggregate, but seems to be due to an additional aggregation (with decrease in the active catalyst surface) of the aggregate. Experiments with a water vapor treatment of the skeleton nickel and subsequent checking of the catalytic activity showed that the decrease depends very much on the pressure at the water vapor treatment (Fig 2). A strong growth of the crystal aggregate (almost to the recrystallization) was observed. At a treatment of the catalyst with a mixture of water vapor - carbon dioxide, no recrystallization could be observed and a further hydrogen treatment of the catalyst caused a noticeable recovery of the catalytic activity. A nitrogen treatment under pressure of the skeleton nickel increased the aggregate of the catalyst to a small degree ✓

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Investigation of the Influence of Water Vapor
on the Activity and Structure of the Skeleton
Nickel Catalyst

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SOV/76-33-11-32/47

while the catalytic activity was completely restored by a
treatment with hydrogen. There are 3 figures, 1 table, and
5 references, 3 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut organicheskoy khimii im.
N.D. Zelinskogo (Academy of Sciences, USSR, Institute of
Organic Chemistry, imeni N.D. Zelinskiy) ✓

Card 3/3

5(3)

AUTHORS: ~~Preydlin, L. Kh.~~, Balandin, A. A., Academician, Zhukova, I.P. SOV/20-124-3-30/67

TITLE: The Selective Hydrogenation of the Acetylene Bond in Butine-2-Diol-1,4 Into the Ethylene Bond on a Nickel Catalyst
(Selektivnoye gidrirovaniye atsetilenovoy svyazi butin-2-diola-1,4 v etilenovuyu na nikelevom katalizatore)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 3, pp 598-601 (USSR)

ABSTRACT: It is a well-known fact that, in the presence of pyridine (or quinoline), acetylene hydrocarbons are selectively hydrogenated into ethylene hydrocarbons on a skeletal nickel catalyst. Two experiments were carried out: (1) at normal pressure, 20°C, and strong shaking; (2) at increased pressure, in a rotating autoclave. Ethanol, methanol, dioxane, and dimethyl formamide were used as solvents. In ethanol or methanol only, butinediol is quickly hydrogenated into butanediol. However, the hydrogen absorption curve points to a gradual hydrogenation. In dioxane the reaction occurs more slowly. After the addition of pyridine, the reaction starts to become selective, the affiliation of the second hydrogen mol is

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SOV/20-124-3-30/67
The Selective Hydrogenation of the Acetylene Bond in Butine-2-Diol-1,4
Into the Ethylene Bond on a Nickel Catalyst

significantly inhibited. At a higher pyridine concentration, the reaction stops after the attachment of the first hydrogen mol, hydrogenation does not go beyond the butenediol. In pure pyridine, the selective reaction occurs slowly. It can be accelerated by increased hydrogen pressure. The resulting product was distilled in the vacuum and identified as butenediol. There are 2 figures, 1 table, and 5 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR
(Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: September 2, 1958

Card 2/2

5(2, 3)

AUTHORS:

Freydlin, L. Kh., Sharf, V. Z.

SOV/20-124-4-33/87

TITLE:

On the Relationship Between the Acid Nature of Trisubstituted Calcium Phosphate and Its Catalytic Activity in Hydrolysis Reactions (O svyazi mezhdu kisloy prirodoy trekhzameshchennogo fosfata kal'tsiya i yego kataliticheskoy aktivnost'yu v reaktsiyakh gidroliza)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 4, pp 949-951 (USSR)

ABSTRACT:

A high activity of the above-mentioned phosphate was determined in the reaction of dehydration (Ref 1), hydration (Ref 2) and hydrolysis of benzene halides in the vaporous phase (Ref 3) in papers previously published by the authors. It is assumed that this is due to its acid nature. In order to clarify the question whether its catalytic activity really decreases in the presence of bases, the authors studied the hydrolysis of vinyl ethers with this phosphate and its deactivation by bases: amines and alkali hydroxides. After each experiment which lasted about one hour, the catalyst was regenerated by treatment with air for two hours at 400°. Table 1 shows the constants of the compounds to be hydrolyzed, experimental conditions and

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On the Relationship Between the Acid Nature of
Trisubstituted Calcium Phosphate and Its Catalytic
Activity in Hydrolysis Reactions

SOV/20-124-4-33/67

results. It may be seen from it that hydrolysis on a phosphate catalyst takes place more rapidly at relatively low temperatures. Vinyl-n-butyl, α -methyl-vinyl phenyl, α -methyl-vinyl-m-cresyl ether and 4,5-dihydrosilvan were hydrolyzed almost quantitatively at 160°; vinyl-phenyl and vinyl-2,4-dichloro-phenyl ether to 65 and 77% respectively. Without catalyst, vinyl-n-butyl ether, for instance, is hydrolyzed to 3% also at 220°. The experiments 1-12 show the influence exercised by the bases upon the catalyst activity. In the presence of large amounts of triethylamine the hydrolysis of the ethers ceases almost completely. In its presence the degree of hydrolysis of vinyl-aryl ethers rapidly decreases. Apparently, the triethylamine adsorbed on the catalyst is incessantly desorbed and removed by steam. Figure 1 shows the logarithm dependence of the hydrolysis degree (lg m) of vinyl-aryl ethers (calculated according to the yield of phenols) on the amount of triethylamine let through. It results from the curves that there is an exponential interdependence between the catalyst activity and the triethylamine introduced into the range of reaction. However, it follows from figure 1

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On the Relationship Between the Acid Nature of SOV/20-124-4-33/67
Trisubstituted Calcium Phosphate and Its Catalytic Activity in
Hydrolysis Reactions

that an additional increase of the amount of triethylamine exercises a less intense deactivating influence. The effect of pyridine which is a very strong base is less intense than that of triethylamine. Also mineral bases have a deactivating effect (potassium hydroxide). The above-mentioned facts confirm the assumption that the phosphate catalyst has an acid nature. There are 4 figure, 1 table, and 8 references, 3 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskogo of the Academy of Sciences, USSR)

PRESENTED: September 2, 1958, by A. A. Balanin, Academician

SUBMITTED: September 1, 1958

Card 3/3

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SOV/20-129-5-28/64

AUTHORS: Petrov, A. D., Corresponding Member, AS USSR, Freydlin,
L. Kh., Kudryavtsev, G. I., Sladkova, T. A., Vdovin, V. M.,
Sheyn, T. I.

TITLE: Catalytic Hydrogenation of Silicon-containing γ -nitriles
and the Fiber-forming Properties of Polyamides Obtained
From the Amines Produced Thereby 7

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 5,
pp 1064 - 1067 (USSR)

ABSTRACT: The hydrogenation mentioned in the title has been hitherto
little investigated (Refs 1,2). By the investigation under
review, the authors succeeded in producing amides hitherto
not described in publications. Polyamides (with a siloxane
group) obtained on the basis of dicarboxylic acids of the
aliphatic series are known to exhibit caoutchouc-like pro-
perties in a number of cases (Ref 3). The condensation of
aromatic dicarboxylic acids (with a siloxane group) with
hexamethylene diamine yields fiber-forming polyamides (Ref 1).
In both cases the siloxane group in the dicarboxylic acids
effects the melting temperature of the polyamides obtained 4

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SOV/20-129-5-28/64

AUTHORS:

Petrov, A. D., Corresponding Member, AS USSR, Freydlin,
L. Kh., Kudryavtsev, G. I., Sladkova, T. A., Vdovin, V. M.,
Sheyn, T. I.

TITLE:

Catalytic Hydrogenation of Silicon-containing γ -nitriles
and the Fiber-forming Properties of Polyamides¹ Obtained
From the Amines Produced Thereby

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 5,
pp 1064 - 1067 (USSR)

ABSTRACT:

The hydrogenation mentioned in the title has been hitherto
little investigated (Refs 1,2). By the investigation under
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aliphatic series are known to exhibit caoutchouc-like pro-
perties in a number of cases (Ref 3). The condensation of
aromatic dicarboxylic acids (with a siloxane group) with
hexamethylene diamine yields fiber-forming polyamides⁴ (Ref 1).
In both cases the siloxane group in the dicarboxylic acids
effects the melting temperature of the polyamides obtained

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Catalytic Hydrogenation of Silicon-containing

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γ -Nitriles and the Fiber-forming Properties of Polyamides Obtained From the Amines Produced Thereby

therefrom to be reduced. The authors intended to investigate the properties of polyamides produced by using the silicon-containing diamines prepared by themselves. As was to be expected from data contained in publications, the fiber-forming polyamides can be produced solely by condensation of the said diamines with aromatic acids. The authors therefore used diamine salts and terephthalic acid for their experiments. The silicon-containing γ -dinitriles:

$[\text{NC}(\text{CH}_2)_3\text{-Si}(\text{CH}_3)_2]_2\text{O}$, $[\text{NC}(\text{CH}_2)_3\text{-Si}(\text{CH}_3)(\text{C}_2\text{H}_5)]_2\text{O}$ and

$[\text{NC}(\text{CH}_2)_3\text{-Si}(\text{C}_2\text{H}_5)_2]_2\text{O}$ were obtained by hydrolysis of the

γ -cyano-propyl-dialkyl-chlorosilanes (Ref 4).

$\text{NC}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\text{-Si}(\text{CH}_3)_2\text{CH}_3$ was obtained from a mixture of

$\text{NC}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\text{-Si}(\text{CH}_3)\text{Cl}$ (120 g) and anhydrous pyridine

(104 g) in anhydrous ether (800 ml) on cooling with ice water and on adding 40 g of absolute methanol during 1 h of vigorous stirring. This substance has not yet been

described in publications. The nitriles were hydrogenated in

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Catalytic Hydrogenation of Silicon-containing
 δ - nitriles and the Fiber-forming Properties of Polyamides Obtained From
 the Amines Produced Thereby

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a rotating steel autoclave with nickel skeleton catalyst and ammonia. The amine fraction was readily distilled by fractionating the catalyzate. Its degree of purity was 97-100% (Table 1). Table 1 also specifies the experimental conditions and yields. Table 2 supplies the constants of amines and their derivatives. In this manner the following symmetrical di(δ -amino-butyl)-tetra-alkyl disiloxanes were produced: I) (see Scheme) along with its salt with terephthalic acid ($C_{12}H_{32}Si_2N_2O.C_8H_6O_2$); II) (see Scheme) together with its salt with terephthalic acid ($C_{14}H_{36}Si_2N_2OC_8H_6O_2$); ✓ III) (see Scheme) together with its salt with terephthalic acid ($C_{16}H_{40}Si_2N_2OC_8H_6O_2$). The yield drops with the prolongation of the lateral alkyl groups and is in I -92%, II - 87%, III - 70%. Table 2 shows the constants of the amines and their salts with terephthalic acid. The yield of the salts was 80-85%. All amines obtained are colorless clear liquids, non-soluble in water (they form an emulsion), soluble in 50% alcohol. The polyamides were obtained by

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SOV/20-129-5-28/64

Catalytic Hydrogenation of Silicon-containing
- nitriles and the Fiber-forming Properties of Polyamides Obtained From
the Amines Produced Thereby

heating (polycondensation) of the produced salts in nitrogen atmosphere. They are pale-yellow, horny, elastic, transparent resins of amorphous structure, well soluble in cresol and concentrated H_2SO_4 . They swell in hydrochloric and formic acid, but do not solve. Table 3 shows the conditions of polycondensation. All these polyamides, when melted, yield fibers, which are dilatible by 300-400% at low temperature. The stability of the fibers is not very high. The results obtained confirmed that the substitution of methyl radicals on the silicon atom by ethyl radicals causes the polyamide melting temperature to drop. The siloxane group in the principal chain increases the flexibility and elasticity (like the oxygen atoms). There are 2 tables and 6 references, 2 of which are Soviet. 4

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR). Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

Card 4/5

Catalytic Hydrogenation of Silicon-containing
α-nitriles and the Fiber-forming Properties of Polyamides Obtained From
the Amines Produced Thereby

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SOV/20-129-5-28/64

SUBMITTED: August 3, 1959

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reports to be presented at the 2nd Intl Congress on Catalysis, Paris, France, 4-9-54. 1957.

PLATE 1 BOOK INFORMATION 809/322

Problem Element 1 booklet. [c] 10; Math 1 Problem-solving booklet (Problems of Elements and Calculus). [vol.] 22; Physics and Chemistry of Calculus) Moscow, 1960, 461 p. English translation inserted. 2,600 copies printed.

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REMARKS: This collection of articles is addressed to physicists and chemists and to the community of scientists in general interested in recent research on the physics and physical chemistry of catalysis.

CONTENTS: The articles in this collection were read at the conference on the Physical and Physical Chemistry of Crystallites organized by the Royal Netherlands Academy of Sciences, Amsterdam, 1963, and were published in the *Journal of Physical Chemistry*, Vol. 67, No. 1, 1963, and by the Academic Council on the problem of "The scientific bases for the selection of materials." The Conference was held at the Institut National de Chimie Industrielle (Institute of Physical Chemistry of the A. 2200) in Nancy, France, March 21-23, 1963. Of the great mass of material presented at the conference, only papers not published elsewhere were included in this collection.

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Synthesizing, V.I., G.P. Lomonosov, and I.I. Stepanov [Constitute of Pyrites of the ASTROCHEM]. Change in the Surface Contact Potential of Germanium During Adsorption and Catalysis

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